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HiFAST successfully completes first flight test

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WRIGHT-PATTERSON AFB, Ohio --- The Air Vehicles Directorate and the Munitions Directorate successfully completed the first flight test of the High Frequency Acoustic Suppression Technology (HiFAST) air flow control device under a cooperative research effort between Australia and the United States.

HiFAST was developed to replace the spoilers traditionally used to reduce acoustic resonance created by opening weapons bay doors at high speeds. It is a second generation device that requires less flow than the first generation Active Separation Control device.

By injecting air through nozzles at the front of an aircraft's weapons bay, the HiFAST device effectively reduces weapons bay acoustics and aids in safe weapons separation without using any moving parts or extending past the surface of the air vehicle.

For the flight test, engineers fitted HiFAST onto a Royal Australian Air Force F-111. While the F-111 flew at subsonic, transonic, and supersonic speeds, scientists collected acoustic, thermal, and vibration data from instrumentation placed throughout the aircraft's weapons bay. In addition, data was collected during release of the Powered Low-Cost Autonomous Attack System 250 pound subpack munitions, developed by the Munitions Directorate. Throughout the tests, HiFAST successfully reduced the acoustic noise levels in the open weapons bay.

HiFAST is a device located within the leading



The Australian F-111 used in HiFAST demonstration. Insert: High Frequency Acoustic Suppression Technology airflow control device mounted on F-111 in preparation for flight test.

edge of the aircraft weapons bay that can be controlled by the flight engineer or pilot during flight. It contains nozzles that inject the air stream with pulses of supersonic high pressure air, which counter airflow instabilities generated by opening a weapons bay door. Without HiFAST, opening weapons bay doors during flight creates a highly unstable shear layer or an area where airflow transitions sharply from the high speed air flow outside the weapons bay to slower speed air flow within the bay. This results in unstable pockets of circular rotating air, called vortices, which hit the weapons bay walls and generate acoustic waves. These acoustic waves flow back up the air stream causing acoustic resonance, producing strong vibrations that may damage the aircraft, its systems, and the weapons it carries.

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